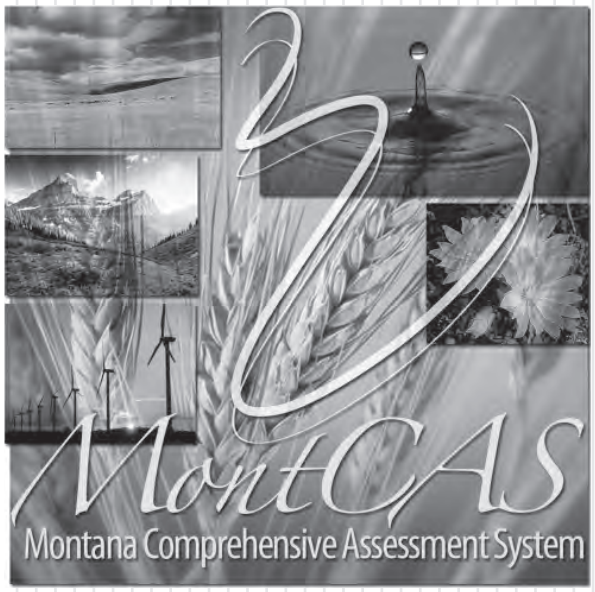
Montana Comprehensive As sess ment System (MontCAS CRT)

Grade 10
Common Released Items
Spring 2010



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Montana
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Denise Juneau, State Superintendent

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Reading Directions for Spring CRT

This Reading test contains three test sessions. Mark or write y our ans wers in the Answer Booklet. Use a pencil to mark or write y our ans wers.

This test includes tw o types of questions: multiple-choice and constr ucted-response questions.

For the multiple-choice questions, y ou will be gi ven four ans wer choices—A, B , C, and D . You are to choose the cor rect ans wer from the four choices. Each question has onl y one ans wer. After y ou have chosen the cor rect ans wer to a question, fi nd the question number in y our Answer Booklet and completel y fi ll in the circle for the ans wer y ou chose. Be sure the question number in the Answer Booklet matches the question number in the Test Booklet. The e xample belo w sho ws ho w to completely fi ll in the circle.

CORRECT MARK	INCORRECT MARKS
●	❍ ⊙ ◘ ⊘

If y ou decide to change y our ans wer to a question, erase the wrong mark completel y before fi lling in the circle of the ne w ans wer. Be sure y ou ha ve onl y one ans wer mark ed for each question. **If tw o circles ar e b ubbled in f or the same question, that question will be scor ed as incorr ect.**

If y ou are ha ving diffi culty ans wering a question, skip the question and come back to it later . Mak e sure y ou skip the circle for the question in y our Answer Booklet.

For the other types of questions in the Test Booklet, y ou will be ask ed to write y our ans wers in the box pro vided. Read the question carefull y. If a question asks y ou to e xplain y our ans wer or to sho w your w ork, be sure to do so.

You ma y mak e notes or use highlighters in y our Test Booklet, but y ou must bubb le or write y our fi nal answers in y our Answer Booklet. **Do not mak e an y str ay or unnecessary mar ks in y our Answer Booklet.**

Let's w ork through a sample question to gether to be sure y ou understand the directions.

Sample Question

1. What is the capital of Montana?
   A. Browning
   B. Glendive
   C. Helena
   D. Missoula

Reading

Read this article about a discovery in Montana. Then answer the questions that follow.

Researchers Uncover New Burrowing Dinosaur

Paleontologists have uncovered the skeletal remains of 95-million-year-old burrowing dinosaurs.

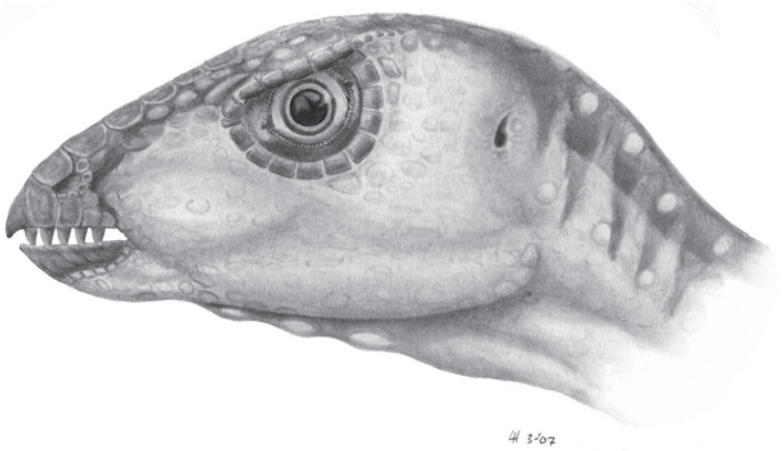

Illustration 1: an artistic interpretation of a burrowing dinosaur

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ScienceDaily (Mar. 26, 2007)—An Emory University paleontologist, collaborating with colleagues from Montana State University and Japan, has uncovered the world's first fossil evidence of burrowing behavior in dinosaurs. The study appears in the current Proceedings of the Royal Society B: Biological Sciences issue online.

The 95-million-year-old skeletal remains of the diminutive dinosaur—along with the bones of two juveniles—were found tucked into a fossilized chamber at the end of a sediment[1]-filled burrow in southwestern Montana.

"The discovery represents the first scientific evidence that some dinosaurs not only dug burrows but also cared extensively for their young inside their dens," says Anthony Martin, senior lecturer in Emory's Department of Environmental Studies, of the newly named species of dinosaur, *Oryctodromeus cubicularis*, meaning "digging runner of the lair."

The discovery is reported by Martin and his colleagues, David Varricchio, of Montana State University, Bozeman; and Yoshihiro Katsura of Gifu Prefectural Museum in Japan. The study was funded by the Jurassic Foundation and the Department of Earth Sciences at Montana State University.

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[1]sediment: settled matter

"The presence of an adult and two juveniles within a denning chamber represents some of the best evidence for dinosaur parental care," Varricchio says. "The burrow likely protected the adult and young *Oryctodromeus cubicularis* from predators and harsh environmental conditions. Burrowing behavior may have allowed other dinosaurs to survive in extreme environments such as polar regions and deserts, and questions some end-Cretaceous extinction hypotheses."

The study notes that the dimensions of the burrowing tunnel and its end chamber were only slightly larger than the skeletal remains of the adult *Oryctodromeus cubicularis*, making it difficult for relatively large predators to enter the tunnel. Through
5 computational analysis, the researchers estimated that the herbivorous[2] dinosaur weighed between 22 kg and 32 kg (48–70 pounds), was 2.1 m long (about seven feet), including a 1.25 m tail (4 feet), and had a trunk breadth of 26 cm to 30 cm (10–12 inches). The juveniles were about 55 to 65 percent the size of the adult.

Because the burrow was filled with sediment, the researchers hypothesize that the dinosaurs had drowned after water breached a nearby riverbank and flooded their den. The sediment, says Martin, helped preserve all three skeletons as well as the burrow structure.

The dinosaur's functional morphology[3] gleaned from its skeleton also confirms that *Oryctodromeus cubicularis* was both a seasoned digger and an accomplished runner. *Oryctodromeus cubicularis* possessed several physical traits suited for digging: a
7 modified snout that could be used as a shovel; large bony attachments in the shoulder to accommodate powerful muscles; and a robustly built hip that allowed for bracing during digging. In contrast to many modern digging animals, the dinosaur had long hind limbs and was well adapted for running on two legs.

In addition to the three dinosaurs found, the team also uncovered fossil evidence of other burrowing animals, most likely invertebrates, which lived alongside *Oryctodromeus cubicularis*. The finding reinforces the idea that the dinosaur was a burrower.

"As we dug, we found five or six small burrows coming off the main one, filled with the same sediment, which convinced me that this was a dinosaur burrow," says Martin. "Burrowing vertebrates often live in the same environment with burrowing bees, wasps or beetles." Martin says he and his colleagues will return to Montana to see if they can find more burrows as previously uncovered fossil evidence indicates that other species of herbivorous dinosaurs often lived in nesting colonies.

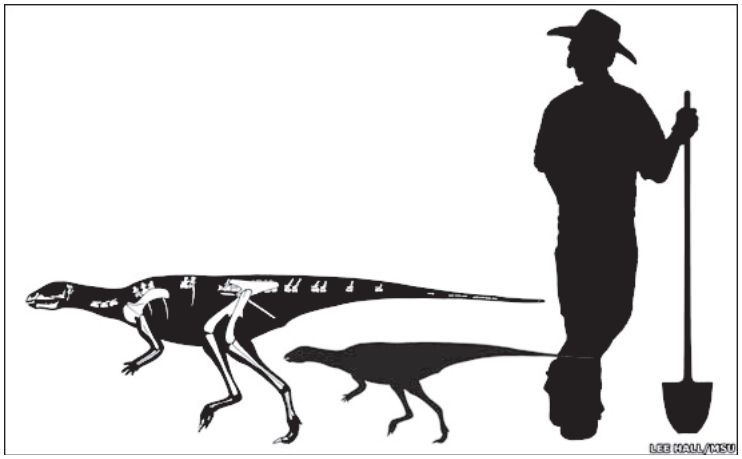

Illustration 2: the adult and juvenile *Oryctodromeus cubicularis* in scale with a person

[2]herbivorous: plant-eating
[3]morphology: the form and structure of an organism

1. In paragraph 5, the author encloses information in parentheses **mainly** to show the

   A. conversion of metric measurements.
   B. average volume of the dinosaurs.
   C. extreme sizes of unearthed dinosaurs.
   D. measurements of various species.

2. Based on information in paragraph 5 and **Illustration 2**, what does the word diminutive mean in the first paragraph?

   A. common
   B. deadly
   C. small
   D. young

3. In paragraph 7, why does the author **most likely** mention the analysis of the dinosaur's skeleton?

   A. to support the idea that the dinosaur was suited to its environment
   B. to argue that the dinosaur lacked the ability to escape its environment
   C. to reinforce the idea that the dinosaur was able to survive without tools
   D. to question whether the dinosaur would have been found anywhere else

4. Why does the author **most likely** conclude this article with the mention of "nesting colonies"?

   A. to discuss the ways dinosaurs protected themselves
   B. to explain that dinosaurs were very much like birds
   C. to suggest that dinosaurs perished from starvation
   D. to hint at the possibility of finding more dinosaur fossils

5. What is the **main** purpose of this article?

   A. to announce a recently discovered type of dinosaur
   B. to present evidence that dinosaurs were intelligent
   C. to question past ideas about why dinosaurs died out
   D. to encourage exploration for additional new dinosaurs

6. This article is an example of nonfiction because it

A. includes illustrations.
B. describes a popular topic.
C. includes scientific names.
D. describes actual evidence.

7. Which database would **most likely** provide information about fossils of burrowers?

A. a database of paleontology
B. a database of biology
C. a database of geology
D. a database of morphology

Read these articles about how to tie knots. Then answer the questions that follow.

Knots to Know

Robert Kimber

As any Boy Scout book will tell you, there are three criteria for a good knot: It should be easy to tie, stay tied, and be easy to untie. Ease in untying is probably the most neglected department. I don't know how many fingernails I've broken and hours wasted untying Gordian knots* that could have been dismantled instantly if their makers had only tied them *slipped*. That expedient is familiar to us all as the quick-release loops we tie into our shoelaces every day. Pull on either loose end and the knot unties. A quick-release loop can be incorporated into many knots, greatly easing the untying process without compromising security.

Creating the correct configuration is only the first step in tying a secure knot. The knot then has to be snugged up evenly and tightly so it keeps its form. If this is not done, the knot may capsize under stress: that is, alter its form. The result is a knot that may slip or possibly evaporate altogether. It is also crucial to leave long ends so when the knot is tightened you are not left with tiny stubs that will pull through and out under tension. . . .

2

There are literally thousands of knots, but most of us can get by with only a few. Perhaps the most indispensable of all knots is the bowline. This is the ideal fixed loop. It is simple, utterly bombproof, and so easy to untie that a quick-release loop is usually superfluous.

3

The most useful knob or stopper knot is the figure eight. It forms a larger, more reliable knot than the simple overhand knot and is much easier to untie. This is what you tie in the end of a rope if you don't want it to slip through a pulley or a hole drilled through a board, or if you want some additional security for a knot tied in a slippery rope.

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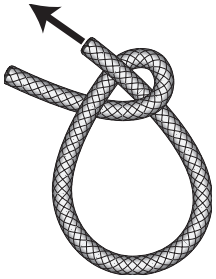
*Gordian knot: an intricate problem; *especially* a problem, insoluble in its own terms, often used in the phrase *cut the Gordian knot*

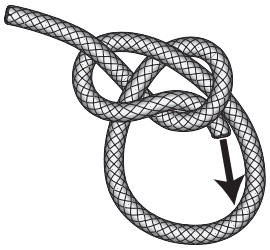
TYING A BOWLINE KNOT

Hugh McManners

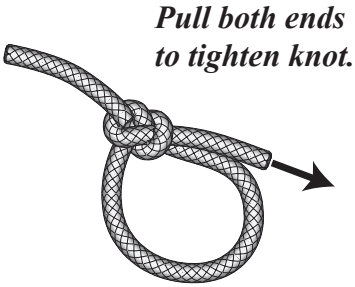
A bowline is used to form the loop of a lifeline because it will not slip or work itself loose. The way to tie a bowline can be remembered using the analogy of a rabbit, a hole, and a tree *(see below)*. For extra safety, a simple knot can be tied in the trailing end.



1 Make an overhand loop and bring the end up through it. (The end—the "rabbit"—comes up through the loop—the "hole.")



2 Take the end around the main rope, then back through the loop ("the rabbit comes out of the hole, goes around the tree, and then back down the hole again").

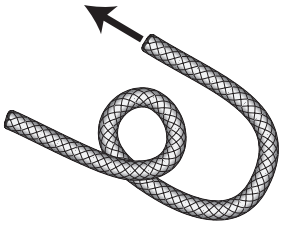


3 Pull the end and the main rope to tighten the knot. The bowline is a useful knot, although many climbers prefer the figure-eight knot *(see below)* for lifelines.

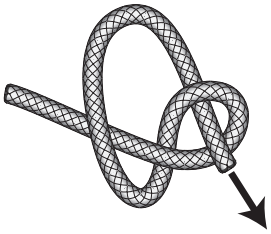
TYING A FIGURE-EIGHT KNOT

Hugh McManners

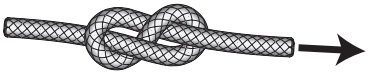
The figure-eight (which you can tie with the rope doubled for extra strength) will not slip or work loose, yet is easy to untie. Use it to form loops, into which you can clip carabiners* and other items.



1 Begin this knot by forming a small underhand loop about 2 ft (60 cm) from the end of the rope.

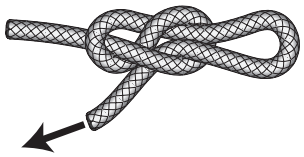


2 Take the loose end over the top of the rope and the loop, then up through the loop, forming a figure-eight.

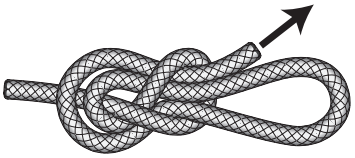


3 Pull both ends to tighten the knot. This stage of the knot can be left in the end of your rope, ready for whenever a loop needs to be formed.

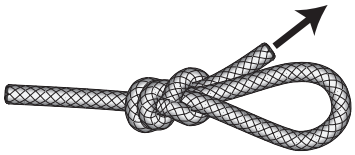
*carabiner: an oblong metal ring with one spring-hinged side that is used , especially in mountain climbing, as a connector and to hold a freel y running rope



4 To form the loop, put the loose end of the rope around whatever you are securing it to, then firmly push it back into the figure-eight knot.



5 Bring the loose end of the rope around the outside of the figure-eight and back up through the first loop. This completes the knot shape and it is now ready for tightening.



6 Pull tight on the finished loop and the long end of the rope. This knot is very reliable and is often used in climbing. It will not work loose, yet may easily be undone.

8. Based on the ar ticles, what aspect of knot tying is **most** frequently overlooked?

   A. reliability of the knot
   B. simplicity of untying
   C. ability to adjust the knot
   D. materials used for tying

9. Which word would **best** replace capsize in paragraph 2?

   A. distort
   B. enlarge
   C. fracture
   D. relax

10. Which phrase is **most likely** represented by the ellipsis (. . .) at the end of parag raph 2?

    A. "causing the knot to untie itself "
    B. "causing the rope to break under the strain"
    C. "causing the knot to become tangled up"
    D. "causing the held object to become damaged"

11. What does the w ord superfluous mean as it is used in parag raph 3?

    A. attractive
    B. complicated
    C. expensive
    D. unnecessary

12. What is **most** important to remember when tying a figure-eight knot?

A. Have a carabiner ready for use.
B. Leave one end of the rope free.
C. Consider using a single line of rope.
D. Have an assistant nearby for rope safety.

13. Which phrase **best** describes an overhand loop?

A. a loop made by bringing the end of the rope over the middle of the rope
B. a loop made by forming a figure-eight with the loose end
C. a loop in which the hands are kept over the middle of the rope
D. a loop in which the rope is passed over the end eight times

14. These articles would be **least** useful to someone who wanted to know

A. a safe knot to tie.
B. the purpose of a knot.
C. an easy knot to untie.
D. what kind of rope to use to tie a knot.

Read this passage by NativeAmerican Joseph Marshall III. Then answer the questions that follow.

Excerpt from *Walking with Grandfather: The Wisdom of Lakota Elders*

Joseph M. Marshall III

Taking walks with my grandfather shaped my life.

In real time, those walks happened more than fifty years ago, but in my memory, they occur any time I want to relive them.

Taking walks with my grandfather was much more than getting from one place to another. The intimacy we formed with the land is unforgettable, of course. But now, as I am approaching that place he was in his life during those walks, I realize that I was walking with wisdom.

His name was Albert, a Sicangu Lakota. He was in his sixties when I came into his life. His shoulders were wide, his arms strong, and his energy nearly boundless. I watched him build a log house, virtually without help. When I was big enough, I helped him harness the horses that pulled our wagon. He taught me how to hunt and how to make bows and arrows. Grandpa Albert could do

4 anything, and I wanted to be like him. Now I have grandchildren of my own, and I'm beginning to realize a fact <u>imperceptible</u> to me as a younger person. It wasn't so much what Grandpa Albert could do that made him unique. Rather his essence as a human being was how he had lived and the insights into life that he had earned because of what he had learned and experienced. He had earned life's gift: wisdom.

Needless to say, I learned much from my grandfather, and not only during my childhood. I can and do recall the valuable lessons he taught, of course, because they are in my file of memories. Interestingly, however, there are moments when something that he said or did will suddenly reveal itself, something that—up until a given moment—I had apparently forgotten. But those memories reappear, as it were, because a current moment gives them meaning. Or, more to the point, a certain statement or piece of advice or an action from the past gives meaning and clarity to the current moment.

For example, not long ago, I watched several television commercials as they came fast and furious in the weeks just before the election. To me, there was no difference among them. One commercial tore down one candidate's record of service and reputation, while another tried to build it up. The commercials reminded me of something that my grandfather had said more than once.

A truly humble person rarely stumbles, he <u>contended</u>, because such a person walks with his face toward the Earth and therefore can see the path ahead. An arrogant person walks with head held high to bask in the glory of the moment.

7 Such a person is likely to stumble because he or she is more concerned with the moment than with what lies ahead. Grandpa Albert's advice was to align oneself with the humble person. If there was a truly humble person in the milieu of vociferous and contentious candidates, that person was lost in the process.

But the first and most enduring lesson from both my grandparents was about identity. Who and what we are as individuals, as a community, as a society, and as a nation, are the strengths and weaknesses with which we face and live life. And what we contribute to the identity of the whole begins with each of us individually. Grandpa Albert illustrated that to me early on.

A child first experiences the tangible. On the walks I took with my grandfather, my first impressions and more obvious memories are first and foremost of the physical environment, the variety of grasses, trees, birds, animals, and so on. Yet the less tangible memories often leave the more indelible impressions.

A river now called the Little White meandered lazily in the valley below my grandmother's land. The log house my grandfather built stood on a plateau north of it. Grandpa Albert called the river *Makizita Wakpa*, the Smoking Earth River. The Lakota named it so because of the smoky mists that hung over the river just after dawn during early spring and late autumn. Many of our walks, in all seasons of the year, were in the valley on either side of this river.

Some of our walks had another purpose. We would look for our horses, or we would pile dried wood, for cooking and heating, which we would later haul with the wagon. Sometimes we would fish in the quiet eddies of the river. Whatever
11 the reason or purpose, Grandpa Albert would make sure that I was paying close attention to the journey itself, no matter how long or short it was. I still vividly recall the first time he pointed out a perfect circle of matted grass, about two feet in diameter, among some chokecherry shrubs.

I couldn't imagine what could cause such an imprint. Was it the single footprint of one of the giants in my grandmother's stories? To my initial disappointment, it was nothing so scary or dramatic. The circle of matted grass had been made by a white-tailed deer, probably the day before we had come along. During the day, the deer had slept there, hidden among the chokecherry shrubs, curled up in a ball. At night, it had left its bed to browse, since deer are nocturnal grazers.

This was my first lesson as a hunter. If you hunt the deer, you must know the deer. All along the trails, there were lessons such as that.

But the one lesson that has helped me through several difficult moments in my life is about the trail itself.

Grandpa Albert had a habit of stopping now and then and looking back down the trail. Frequently, he would take me by the shoulders and ask me to look back at the way we had come. "Remember the trail," he said, "because one of these times I will send you back alone. If you don't remember the way you have come, you will be lost."

That was my first lesson about identity.

Who and what we are is a work in progress. Life shapes us constantly, day in and day out. Life is obviously the trail we walk. No one is exempt; therefore, no one is unaffected by what happens along the way.

15. Why does the narrator **most likely** emphasize how easy it is for him to relive memories?

A. to remark upon his unique ability to imagine
B. to connect his love of writing with his family
C. to show the influence the past has had on him
D. to make the point that he is talking about the past

16. In paragraph 4, the word imperceptible means

A. illogical.
B. infuriating.
C. praiseworthy.
D. unnoticeable.

17. What do the details in paragraph 4 **most** reveal about Grandpa Albert?

A. He was unusual for his age.
B. He was successful in his chosen career.
C. He was good at dealing with outdoor challenges.
D. He was good at understanding the true nature of things.

18. When watching commercials for political candidates, the narrator is reminded that Grandpa Albert believed

A. arguing was a waste of time.
B. television was bad.
C. in modest people.
D. in smart people.

19. In paragraph 7, the word contended means

A. dared.
B. declared.
C. demanded.
D. developed.

20. What does the phrase "I was paying close attention to the journey itself" refer to in paragraph 11?

A. instructions
B. one's dreams
C. one's surroundings
D. directions

21. In the last paragraph, the word exempt means the same as

A. examined.
B. excused.
C. expelled.
D. extra.

22. Which statement establishes the **main** theme of the passage?

A. "The commercials reminded me of something that my grandfather had said more than once."
B. "Such a person is . . . more concerned with the moment than with what lies ahead."
C. "This was my first lesson as a hunter."
D. "If you don't remember the way you have come, you will be lost."

23. The narrator's **most likely** purpose for including the story about the political commercials was to provide an example of

A. the state of world affairs.
B. typical television programming.
C. Grandpa Albert's knowledge of history.
D. Grandpa Albert's understanding of life.

24. The narrator's attitude toward Grandpa Albert is **best** described as

A. aloof.
B. grateful.
C. patient.
D. resentful.

25. This passage is an example of

A. fiction.
B. folktale.
C. memoir.
D. myth.

26. Which book would **most likely** include another personal account about learning from family?

A. *Hearing History*
B. *Living Close to the Land*
C. *Understanding Community*
D. *Voices of Elders*

27. Explain how his experiences with his grandfather helped shape the narrator's sense of identity. Use information from the passage to support your answer.

Scoring Guide

Score	Description
4	Response provides a thorough explanation of how his experiences with his grandfather helped shape the narrator's sense of identity. Explanation includes specific, relevant information from the passage.
3	Response provides an explanation of how his experiences with his grandfather helped shape the narrator's sense of identity. Explanation includes supporting information from the passage, but lacks specificity, relevance, and/or development.
2	Response provides a partial explanation of how his experiences with his grandfather helped shape the narrator's sense of identity. Explanation includes limited information from the passage and/or is partially correct.
1	Response makes a vague or minimal statement of how his experiences with his grandfather helped shape the narrator's sense of identity.
0	Response is totally incorrect or irrelevant.
Blank	No response.

Scoring Notes

A thorough response will include an explanation of how his experiences with his grandfather helped shape the narrator's sense of identity by teaching him to be humble, observant, and aware of the influence of the past on his identity. This will be evidenced by examples that may include, but are not limited to, the following:

- The narrator learned about the importance of being humble from his grandfather, who told him, "A truly humble person rarely stumbles."
- The narrator learned about the importance of his identity as an individual and "as a society, and as a nation" from his grandfather.
- The narrator says, "the one lesson that has helped me through several difficult moments in my life is about the trail itself."
- The narrator quotes his grandfather as saying, "If you don't remember the way you have come, you will be lost," without a firm grounding in the sense of self.
- The narrator adds, "That was my first lesson about identity."
- The narrator concludes, "Who and what we are is a work in progress. Life shapes us constantly, day in and day out. Life is obviously the trail we walk."

Example of Scor e Point 4

The narrator's experiences with his grandfather played a major role in shaping his sense of identity. When he was a young child he believed that his grandfather's uniqueness came from the things he did, but now that he is a grandfather he realizes that his uniqueness came from how he had lived and his wisdom. The narrator's grandfather left him with many lasting memories and lessons. He taught him that to be humble is better than to be arrogant. "A truly humble person rarely stumbles, he is contended, because such a person walks with his face towards the Earth therefore can see the path ahead." His grandfather also taught him that who we are is shaped by our past and what is happening to us now. "Life shapes us constantly day in and day out". The narrators grandfather was a very wise person with a lot of lessons to share and that is how he played such a great role in shaping his grandson's sense of identity.

Example of Scor e Point 3

The narrators experiences with his grandfather shaped his sense of identity by showing him the way of a good person. With is grandfather he learns to be humble. He says it in paragraph seven, when he talks about the humble man & the arrogant man. He learns to keep his eyes open & look for the small details that can help you out down the road. He talks about this in paragraph twelve when he sees the deer beding from the night before. Another experience that shaped his identity is when his grandfather told him to look back & remember the trail, in paragraph fifteen. He learns to rember how you got to were you are and who helped you abng the way. Just because you're were your at dosen't mean you can forget how you got theie.

Example of Scor e Point 2

As the narrator took walks with his grandfather he learned about himself and that everyone should take notice in the environment around theirselves. His grandfather helped the narrator see the insights into life. the grandfather helped the narrator realize that he had earned life's gift: wisdom. On walks with his grandfather, the narrator had to pay attention to the journey itself. The narrator figures out that life shapes everyone constantly everyday.

Example of Scor e Point 1

The narrator had to learn from his grandfather about the past. When he learned about the past he was told that he must remember where he came from in order to know where he was.

Example of Scor e Point 0

The Narrators is the one who is telling the Story and he is also the one who is telling this story about himself. He tells about his memory's with his Grand father.

Mathematics Directions for Spring CRT

This Mathematics test contains three test sessions. Mark or write y our ans wers in the Answer Booklet. Use a pencil to mark or write y our ans wers.

This test includes three types of questions: multiple-choice, shor t-answer, and constr ucted-response questions.

For the multiple-choice questions, y ou will be gi ven four ans wer choices—A, B , C, and D . You are to choose the cor rect ans wer from the four choices. Each question has onl y one ans wer. After y ou have chosen the cor rect ans wer to a question, fi nd the question number in y our Answer Booklet and completel y fi ll in the circle for the ans wer y ou chose. Be sure the question number in the Answer Booklet matches the question number in the Test Booklet. The e xample belo w sho ws ho w to completely fi ll in the circle.

CORRECT MARK	INCORRECT MARKS
●	❍ ⊙ ✪ ⊘

If y ou decide to change y our ans wer to a question, erase the wrong mark completel y before fi lling in the circle of the ne w ans wer. Be sure y ou ha ve onl y one ans wer mark ed for each question. **If tw o circles ar e b ubbled in f or the same question, that question will be scor ed as incorr ect.**

If y ou are ha ving diffi culty ans wering a question, skip the question and come back to it later . Mak e sure y ou skip the circle for the question in y our Answer Booklet.

For the other types of questions in the Test Booklet, y ou will be ask ed to write y our ans wers in the box pro vided. Read the question carefull y. If a question asks y ou to e xplain y our ans wer or to sho w your w ork, be sure to do so.

You ma y mak e notes or use highlighters in y our Test Booklet, but y ou must bubb le or write y our fi nal answers in y our Answer Booklet. **Do not mak e an y str ay or unnecessary mar ks in y our Answer Booklet.**

Let's w ork through a sample question to gether to be sure y ou understand the directions.

Sample Question

1. What is the capital of Montana?
   A. Browning
   B. Glendive
   C. Helena
   D. Missoula

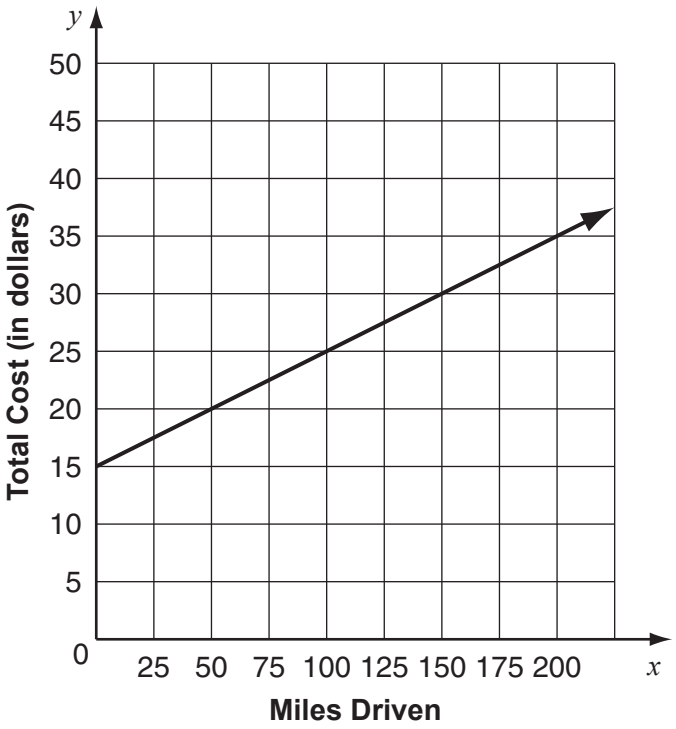
Mathematics (No Calculator)

1. What is the x-value of the solution to this system of equations?

$$2x - 5y = -11$$
$$4x + 15y = 3$$

A. 3
B. 1
C. –1
D. –3

2. The graph below represents the total cost in dollars, y, to rent a car and dri ve x miles.



Which equation describes this g raph?

A. $y = \frac{1}{10}x + 15$

B. $y = \frac{1}{15}x + 10$

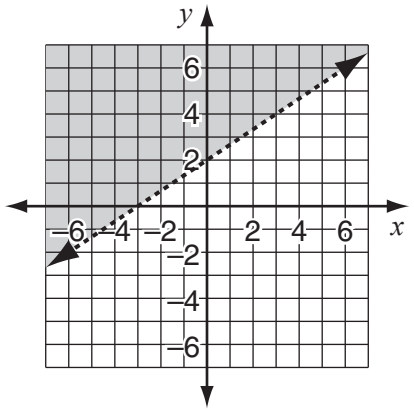
C. $y = 10x + 15$

D. $y = 15x + 10$

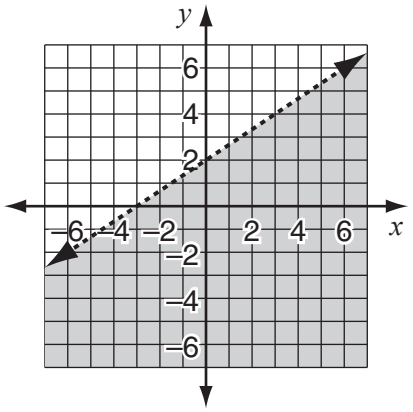
3. Which graph shows the solution to the inequality belo w?

$$2x - 3y < -6$$

A.



C.



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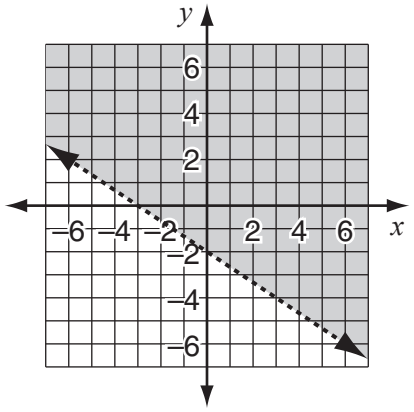

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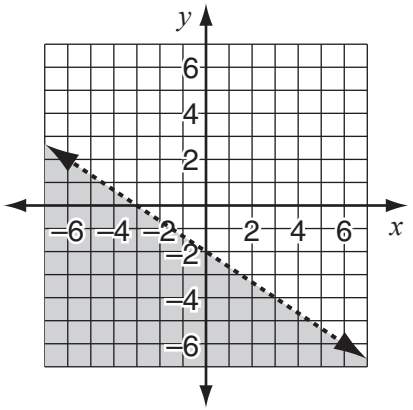


4. Jasmine and Nina ha ve documents printed at a copy store. Each page that is printed costs the same. Jasmine spends $20 to ha ve a 250-page document printed. Ho w much will it cost Nina to ha ve a 150-page document printed?

A. $10
B. $12
C. $15
D. $16

5. The land area of the continent of Asia is approximately 44 million square kilometers. Which expression shows 44 million written in scientific notation?

A. 44×10^6
B. 44×10^7
C. 4.4×10^6
D. 4.4×10^7

6. V iolet walked $\frac{2}{3}$ of the w ay around a lak e. She walked $2\frac{1}{2}$ miles. What is the total distance around the lak e?

A. $3\frac{3}{4}$ miles
B. $3\frac{1}{6}$ miles
C. $2\frac{3}{4}$ miles
D. $1\frac{2}{3}$ miles

7. Which expression has the same v alue as 5^{-3}?

A. $\frac{1}{5 \cdot 3}$
B. $5 \cdot -3$
C. $\frac{1}{5 \cdot 5 \cdot 5}$
D. $-5 \cdot -5 \cdot -5$

8. Ev aluate:

$4 + 2(2 - 5)^2 - 1$

9. What is the v alue of ab^2 when $a = 3$ and $b = 4$?

10. Which expression is equivalent to $5 - 3x(2x - 4)$?

A. $4x^2 - 8x$

B. $4x^2 + 8x$

C. $-6x^2 + 12x + 5$

D. $-6x^2 - 12x + 5$

11. Monica waits for 25 minutes at the base of a mountain to buy an all-day ski pass. She notices that a chair lift takes 12 minutes to get her to the top of a mountain that she skis down in 3 minutes. Which table shows the relationship between the number of times Monica goes down the mountain and the number of minutes that have passed since she arrived at the mountain?

A.

Number of Times Down Mountain	Minutes
1	25
2	40
3	55
4	70

B.

Number of Times Down Mountain	Minutes
1	40
2	55
3	70
4	85

C.

Number of Times Down Mountain	Minutes
1	15
2	30
3	45
4	60

D.

Number of Times Down Mountain	Minutes
1	12
2	15
3	27
4	30

12. A student incorrectly solves an equation using the steps listed in the table below.

Step	Equation
	$4(x + 7) = 2x - 2$
1	$4x + 28 = 2x - 2$
2	$6x + 28 = -2$
3	$6x = -30$
4	$x = -5$

At which step does the student's error first appear?

A. Step 1
B. Step 2
C. Step 3
D. Step 4

13. Water flows into a container at a constant rate. The equation below shows the liters of water, W, in the container after t minutes since the water began to flow.

$$W = 2t + 0.4$$

Which statement is true?

A. There were initially 0.4 liters of water in the container.
B. There were initially 2 liters of water in the container.
C. The water flowed at a rate of 0.4 liters per minute.
D. The water flowed at a rate of 2.4 liters per minute.

14. Kevin visited a restaurant eight times. The number of minutes Kevin waited for his meal each visit is shown in the stem-and-leaf plot below.

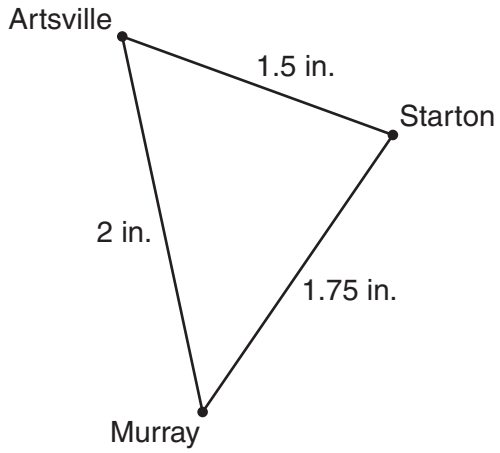
1	0 2 2 6
2	3
3	1 7
4	
5	5

Key
1 | 0 = 10 minutes

Based on the data, what is the probability that, on his next visit to the restaurant, Kevin will have to wait longer than the mean of his previous visits?

A. $\frac{1}{8}$
B. $\frac{3}{8}$
C. $\frac{4}{8}$
D. $\frac{5}{8}$

15. The map below shows three cities connected by a triangular route.



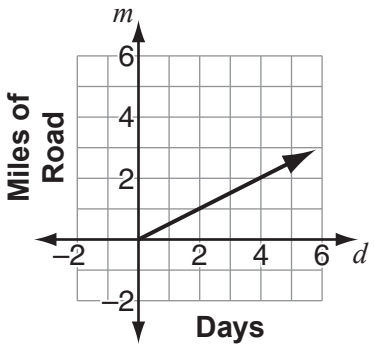
Key
3 in. represents 100 miles

About how many miles is it from Artsville to Murray to Starton and back to Artsville without returning through Murray?

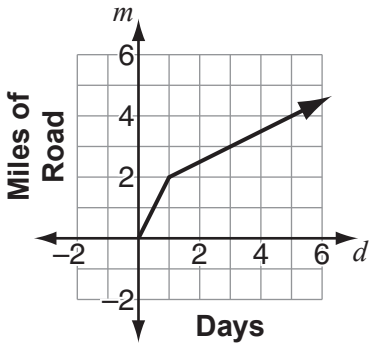
A. 525 miles
B. 375 miles
C. 175 miles
D. 125 miles

16. A construction crew is paving a new road. On the first day, they paved 0.5 mile of the road. After the first day, they paved an average of 2 miles per day. Which graph shows the relationship between days worked and miles of road paved?

A.



B.



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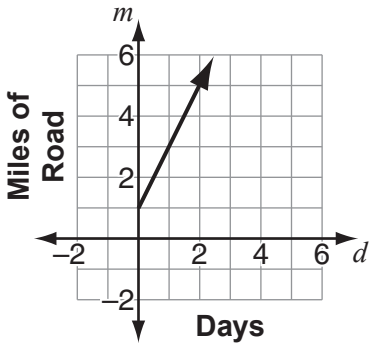
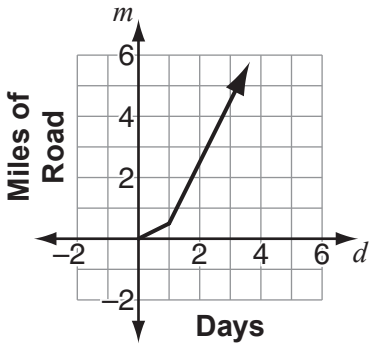


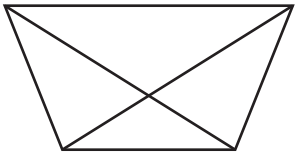
D.

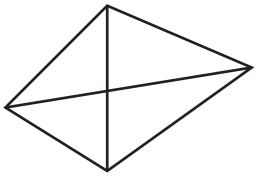


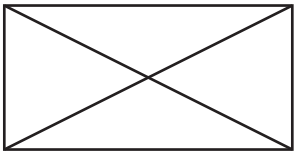
17. Franklin wrote the statement sho wn below.

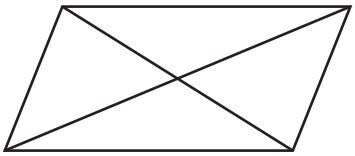
> If a quadrilateral has congruent diagonals, then the quadrilateral is a parallelogram.

Which quadrilateral appears to be a counterexample to this statement?

A. 

B. 

C. 

D. 

Use the CD shown below to answer question 18.

18. What is the appro ximate area of the CD? (Do not include the area of the hole in the center of the CD.)

A. 106 cm^2
B. 111 cm^2
C. 340 cm^2
D. 349 cm^2

19. The manager of a music store compares the number of CDs sold with the number of days since the CD w ent on sale. Which type of display would **best** represent the manager's data?

A. line graph

B. circle graph

C. box-and-whisker graph

D. stem-and-leaf graph

20. Study this number patter n.

3, 9, 21, 39, . . .

What is the ne xt number in this patter n?

A. 189

B. 117

C. 63

D. 57

21. The vertices of a triangle are $A(1, 5)$, $B(-2, -3)$, and $C(4, -3)$. Which type of triangle is ΔABC?

A. equilateral

B. isosceles

C. obtuse

D. scalene

22. The number of hours Malcolm slept on each of the fi rst six da ys one w eek are listed belo w.

$$8\frac{1}{2},\ 6,\ 9\frac{1}{4},\ 9,\ 7,\ 8\frac{3}{4}$$

Malcolm slept for a mean number of 8 hours on each of the se ven days of the w eek. What is the least number of hours he could ha ve slept on the se venth day?

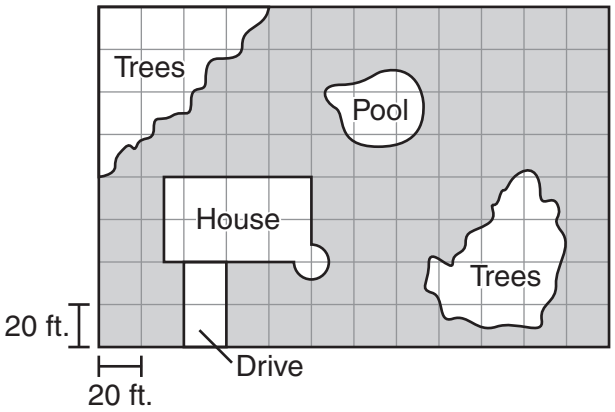
A. 7 hours

B. $7\frac{1}{2}$ hours

C. 8 hours

D. $8\frac{1}{2}$ hours

23. The shaded area in the diagram below represents a lawn.



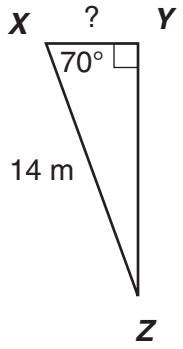
A lawn-cutting service charges by the square foot. What is the best estimate of the area of the lawn?

A. 1,320 square feet
B. 1,920 square feet
C. 12,000 square feet
D. 26,400 square feet

24. The fastest-moving glacier in the world flows at an average speed of 11 km per year. At this speed, how many **meters**, to the nearest hundredth, does the glacier flow each hour?

A. 7.96 meters
B. 6.63 meters
C. 3.01 meters
D. 1.26 meters

25. Marta must find length XY in the right triangle shown below.



Which expression can she use to find XY?

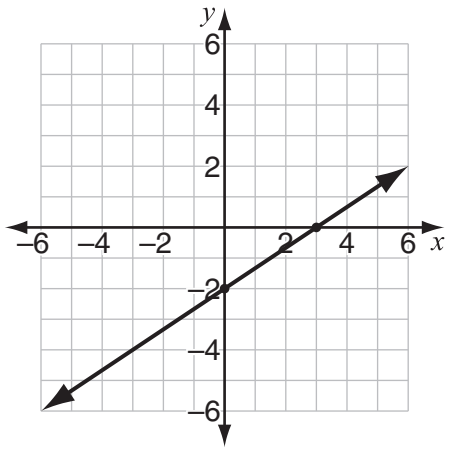
A. $\frac{14}{\sin 70^\circ}$

B. $\frac{14}{\cos 70^\circ}$

C. $14 (\sin 70^\circ)$

D. $14 (\cos 70^\circ)$

Use the graph below to answer question 26.



26. Which equation describes this line?

A. $2x - 3y = 6$
B. $2x + 3y = 6$
C. $3x - 2y = 6$
D. $3x + 2y = 6$

27. The cost of a video game console is $200. Each video game costs an additional $40. Which table shows the relationship betw een the total cost, y, for a video game console and x games?

A.

x	y
1	40
2	80
3	120
4	160

B.

x	y
1	200
2	240
3	280
4	320

C.

x	y
1	240
2	280
3	320
4	360

D.

x	y
1	240
2	440
3	640
4	840

28. Study the figures below.

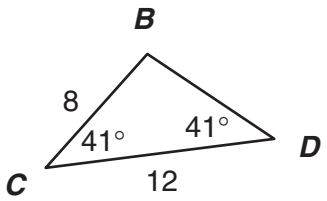


Figure 1

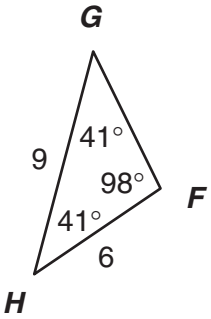


Figure 2

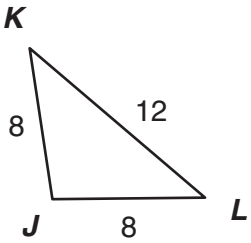


Figure 3

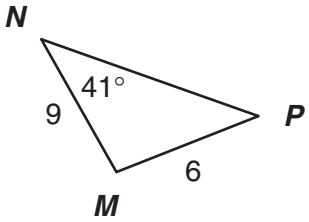


Figure 4

not drawn to scale

a. Which two figures **must** be congruent? Explain your reasoning.

b. Which figures **must** be similar to Figure 3? Explain your reasoning for **each** figure that you chose.

c. In your Answer Booklet, sketch and label a triangle that is similar to the triangle in Figure 3 but **not** congruent to the other triangles. The triangle you sketch does not have to be drawn to scale. Be sure to label the measure of each angle and each side.

Scoring Guide

Score	Description
4	7 points
3	4½ – 6½ points
2	1½ – 4 points
1	½ – 1 point
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Scoring Notes

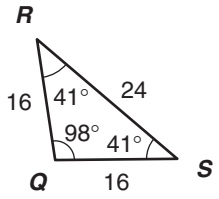
Part a: 2 points for correct figures, **1 and 3**, with explanation
OR
1 point for correct figures, **1 and 3**, with incomplete or no explanation
Part b: Total: 4 points
2 points for **each** correct figure, **1 and 2**, with complete explanation
OR
1 point for **each** correct figure, **1 and 2**, with partial explanation showing some understanding of similarity
Part c: 1 point for correct drawing with all sides and angles labeled
OR
½ point for correct drawing with either all sides labeled OR with all angles labeled

Sample Response:

a. The triangle in Figure 1 is isosceles since two angles are congruent. So *BD* is 8. The triangle in Figure 1 has the same side lengths as the triangle in Figure 3 and is therefore congruent to it.

b. Figure 1 is similar to Figure 3 because all congruent figures are similar.
Figure 2 is also similar to Figure 3. In Figure 2, the triangle is isosceles since angles *H* and *G* are congruent. So *GF* is 6. All three corresponding sides of the two triangles are in the proportion 3:4.
OR
Figure 1 is similar to Figure 3 because corresponding sides of the triangles have the same measures and so are proportional.
Figure 2 is also similar to Figure 3. Since the triangle in Figure 3 is congruent to the one in Figure 1, angles *K* and *L* are 41° angles. The degree measure of $\angle F$ is 180 – 41 – 98 = 41. So two angles of one triangle are congruent to two angles of the other triangle and the triangles are similar.

c. Answers will vary. Accept any isosceles triangle with a 2:3 side ratio other than sides 8-8-12 or 6-6-9.



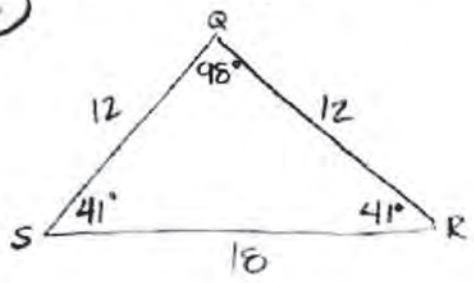
Example of Scor e Point 4

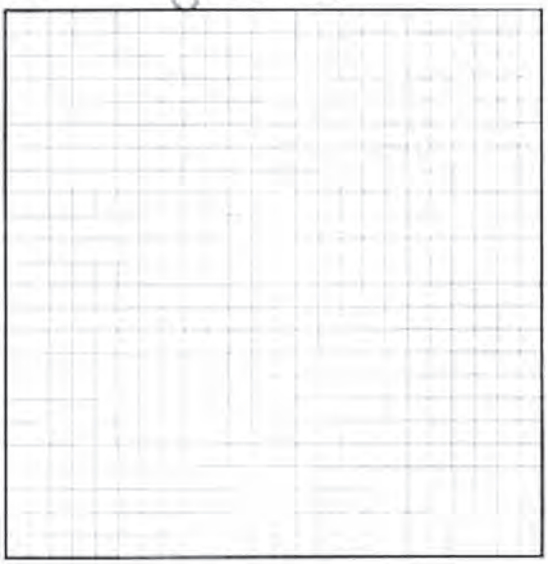
Sample 1

(a) Figure 1 and Figure 3 must be congruent by the SSS Postulate. Just from the diagram you know that 2 of their sides are congruent but then you can use the Converse Isosceles Triangle Theorem to find the measure of BD in Figure 1 to equal 8. Both triangles have all sides congruent so they are congruent.

(b) Figure 1 because we already proved they were congruent and therefore are similar as well. Figure 2 because all of its angles are congruent to those of figure 1 and are also congruent to the angles of figure 3 because corresponding parts of congruent triangles are congruent.

(c)

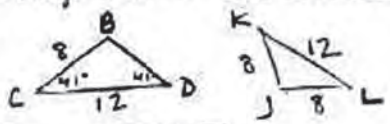




Example of Scor e Point 4

Sample 2

a. Figures 1 and 3 must be congruent because all their sides are equal

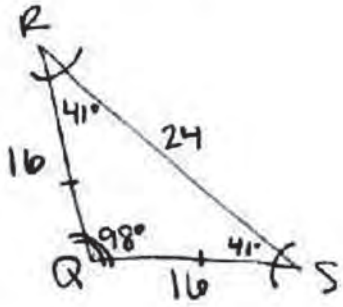


b. Figure one is similar to Figure three because if the are congruent they must be similar.

$\overline{CB} \cong \overline{JL}$
$\overline{CD} \cong \overline{KL}$
$\overline{BD} \cong \overline{KJ}$ (since $\angle BCD = \angle BDC$, opposite sides must also be equal, making $\overline{BD}$ 8 and equal to $\overline{KJ}$.

Figure two is similar to figure three because Figure 3 is $\cong$ to Figure 1, giving it angle measurements of 41°, 41°, 98°, which are the same as figure 2's.

c.



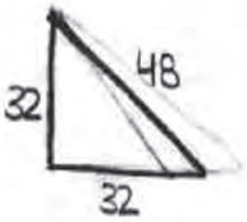
Example of Scor e Point 3

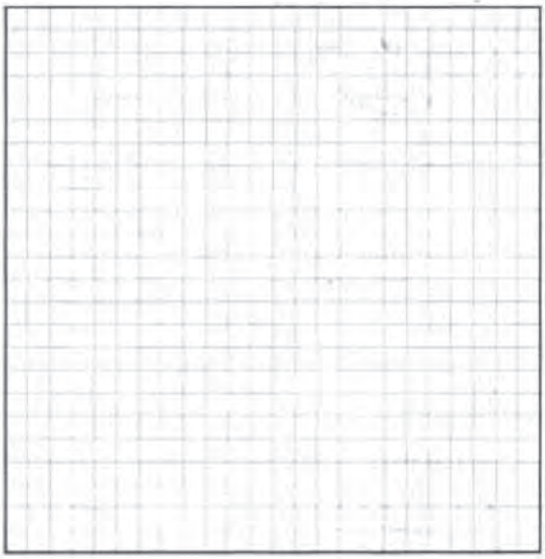
Sample 1

a. Figure 1 & Figure 3
congruent means same shape and size. These figures have 2 sides in common and one angle. SAS. They must be congruent.

B. Figure 2 because the side lengths have a $\frac{3}{4}$ ratio to to Figure 3.
Figure 1 because they are congruent, they are also similar

C.





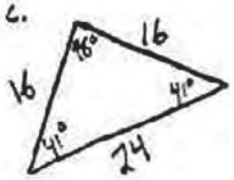
Example of Scor e Point 3

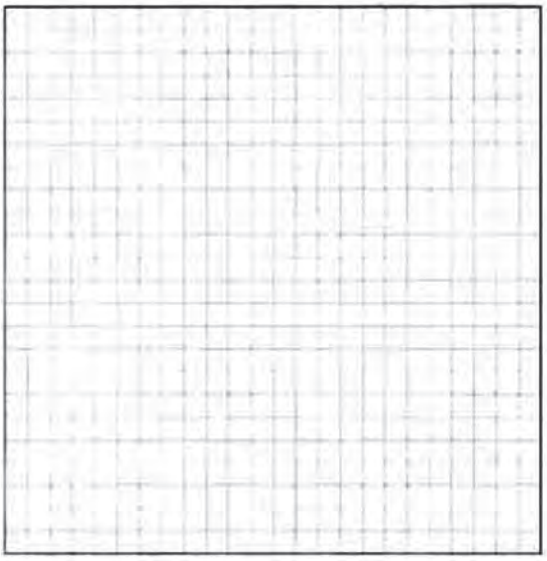
Sample 2

a. Figure 1 and Figure 3 must be congruent because both are isosceles triangles with two legs 8 units long and an hypoteause 12 units long.

b. Figure 2 is similar because they are both isosceles triangle s with angle measures of 41°, 41°, + 98°. Figure 1 is also similar, because it is congruent, and therefore has the same angle measures.

c.





Example of Scor e Point 2

Sample 1

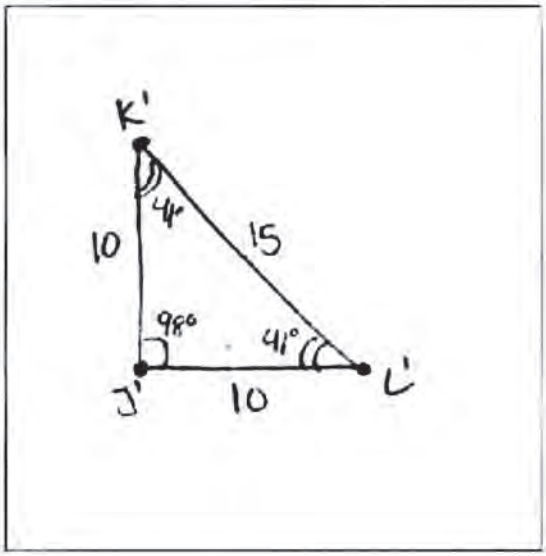
a. Figure 1 ≅ Figure 2 : because they have 3 congruent angles.

b. Figure-1 Figure-2 : Figure 1 is isosceles and so is Figure 3, both figures have equal side lengths so they are similar.

: Figure 2 is isosceles along with Figure 3, the sides of both triangles are congruent

$\frac{12}{10} \times \frac{12}{8}$ $12 \neq 12$ ✓ they are similar

c.



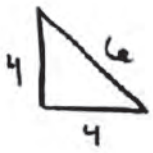
Example of Scor e Point 2

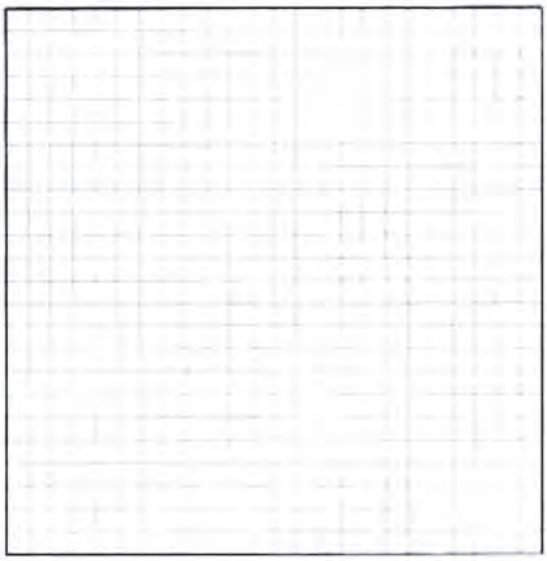
Sample 2

A. Figure 1 and Figure 3 Because side lengths are the same

B. Figure 2 Because the side lengths are 1/4 those of Figure 3

C.



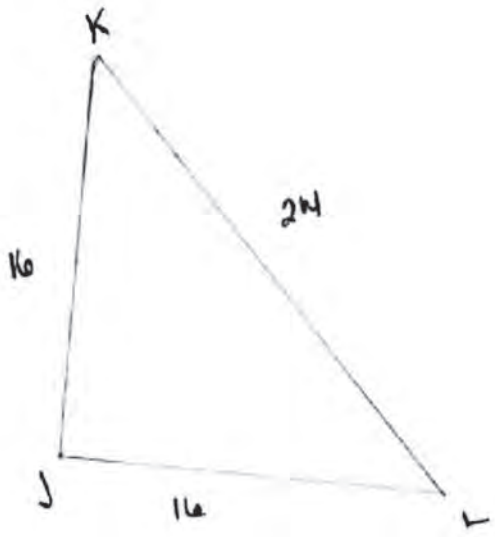


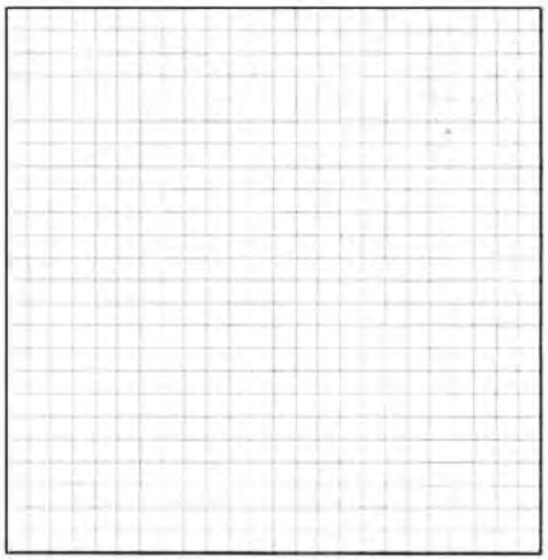
Example of Scor e Point 2

Sample 3

a) figure 1 + figure 3, because the sides are equal. 8 + 12

b) Figure 1 + Figure M, because figure 1 has equal sides. Figure M because it got the same degrees as Figure 1.



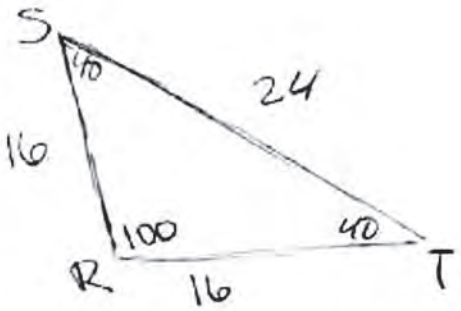


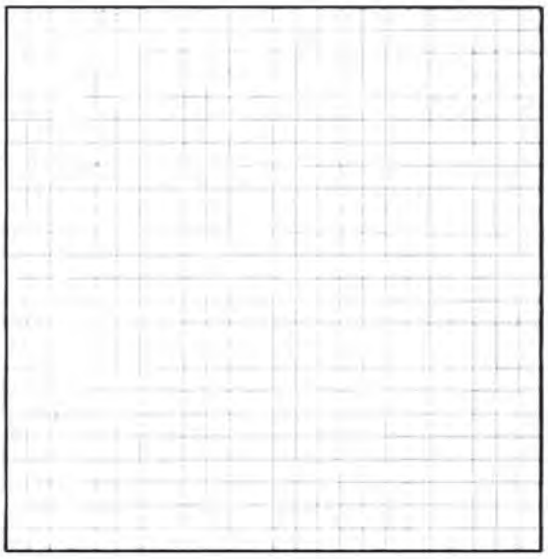
Example of Scor e Point 1

Sample 1

A. $\triangle GHF \sim \triangle NMP$ Figure 2 + figure 4
SAS ~ Sides congruent angle congruent

B. $\triangle KLJ \sim \triangle BCD$
Figure 1 ~ Figure 3
SSS~ They sides are congruent + the angles are congruent





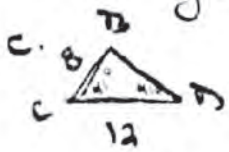
Example of Scor e Point 1

Sample 2

a. Figure 1 and 3, because the side lengths are the same and the angles are congruent also.

b. Figure 1 because it has the same base(12)and one of the same side lenghts which is 8.

c.

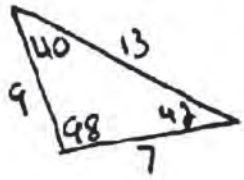


Example of Scor e Point 0

a. Figure 2 and 4 are congruent they have to equel sides are an equel angle

b. Figure 1 is similar to 3 because it has two equel sides.

c.



Science Directions for Spring CRT

This Science test contains three test sessions. Mark or write y our ans wers in the Answer Booklet. Use a pencil to mark or write y our ans wers.

This test includes tw o types of questions: multiple-choice and constr ucted-response questions.

For the multiple-choice questions, y ou will be gi ven four ans wer choices—A, B , C, and D . You are to choose the cor rect ans wer from the four choices. Each question has onl y one ans wer. After y ou have chosen the cor rect ans wer to a question, fi nd the question number in y our Answer Booklet and completel y fi ll in the circle for the ans wer y ou chose. Be sure the question number in the Answer Booklet matches the question number in the Test Booklet. The e xample belo w sho ws ho w to completely fi ll in the circle.

CORRECT MARK	INCORRECT MARKS
●	❍ ⊙ ◘ ⊘

If y ou decide to change y our ans wer to a question, erase the wrong mark completel y before fi lling in the circle of the ne w ans wer. Be sure y ou ha ve onl y one ans wer mark ed for each question. **If tw o circles ar e b ubbled in f or the same question, that question will be scor ed as incorr ect.**

If y ou are ha ving diffi culty ans wering a question, skip the question and come back to it later . Mak e sure y ou skip the circle for the question in y our Answer Booklet.

For the other types of questions in the Test Booklet, y ou will be ask ed to write y our ans wers in the box pro vided. Read the question carefull y. If a question asks y ou to e xplain y our ans wer or to sho w your w ork, be sure to do so.

You ma y mak e notes or use highlighters in y our Test Booklet, but y ou must bubb le or write y our fi nal answers in y our Answer Booklet. **Do not mak e an y str ay or unnecessary mar ks in y our Answer Booklet.**

Let's w ork through a sample question to gether to be sure y ou understand the directions.

Sample Question

1. What is the capital of Montana?
   A. Browning
   B. Glendive
   C. Helena
   D. Missoula

Science

1. Which organisms have a parasite-host relationship?

   A. bird and earthworm
   B. clown fish and anemone
   C. rabbit and wolf
   D. tick and deer

2. Which possible effect of global warming is the **greatest** cause for public concern?

   A. rising sea levels
   B. warmer winters
   C. longer growing seasons
   D. lower rates of respiratory illnesses

3. A student hypothesized that more radish seeds would germinate at warm temperatures than at cold temperatures. She used the procedure below to test the hypothesis.

   1. Line three small, plastic dishes with damp filter paper.
   2. Place 100 radish seeds in each dish.
   3. Cover each dish with plastic wrap.
   4. Place one dish in a freezer, one dish in a refrigerator, and one dish in a cold room.
   5. Wait three days.
   6. On the fourth day, count the number of seeds that have sprouted.

   Which change in the procedure would **most** improve the experiment?

   A. selecting a wider range of temperatures
   B. using more radish seeds in each dish
   C. testing several different types of seeds
   D. exposing the germinating seeds to light

4. In 1953, James Watson and Francis Crick wrote a one-page journal article that described the double-helix structure of DNA. Which scientific work did their article help develop?

   A. the string theory
   B. the use of lasers
   C. the genome project
   D. the use of fusion

5. Which process in cells uses oxygen to produce energy from food?

   A. cell division
   B. cellular respiration
   C. fermentation
   D. photosynthesis

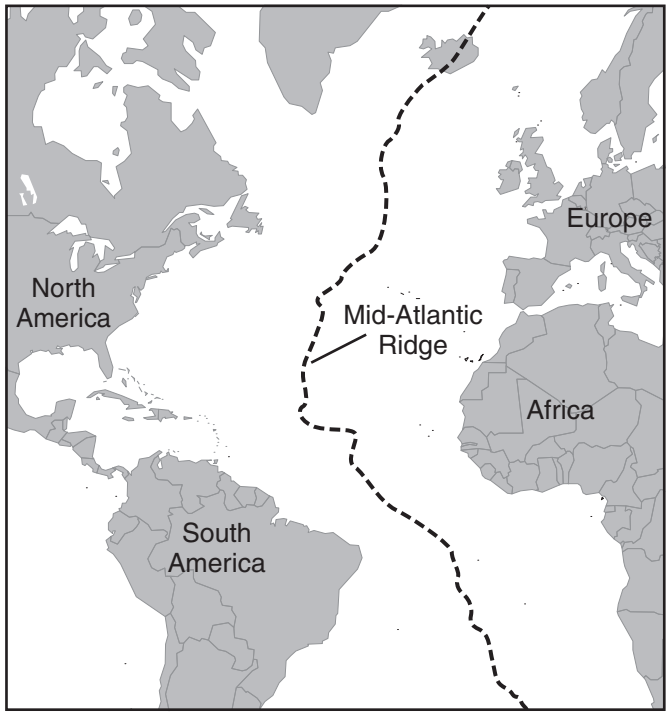
6. At one time people believed Earth was the center of the universe. Which recent discovery provides evidence that Earth is not the center of the universe?

   A. The Moon was once part of Earth.
   B. The universe began with a big bang.
   C. The Sun is powered by hydrogen fusion.
   D. Other stars besides the Sun have orbiting planets.

7. Which process occurs inside stars and creates heat and light energy?

   A. hydrocarbon fuel burning continuously
   B. hydrogen atoms fusing into helium atoms
   C. friction causing the release of heat
   D. convection moving energy from the star's core

8. The map below shows the Mid-Atlantic Ridge, where seafloor spreading occurs.



Which observation is **most** directly related to seafloor spreading?

   A. polar ice caps melting
   B. ocean surface currents circulating
   C. hurricanes forming in the Atlantic
   D. South America moving away from Africa

9. A 100 kg iron statue w as placed in a park and left undisturbed for one y ear. At the end of the y ear, the statue w eighs 114 kg. What is the source of the e xtra mass?

   A. The iron absorbed 14 kg of rainw ater.
   B. The iron reacted with 14 kg of o xygen to create rust.
   C. About 14 kg of iron w as converted to nickel, a heavier element.
   D. About 14 kg of zinc w as added to the iron to make the statue more durab le.

10. The table below lists some proper ties of substances.

Substance	Type	Dissolves in Water? (solubility)	Conducts Electricity? (conductivity)	Color	State of Matter at 21°C
Sodium carbonate	Ionic	Yes	Yes	White	Solid
Copper sulfate	Ionic	Yes	Yes	Blue	Solid
Sugar	Molecular	Yes	No	White	Solid
Paradichlorobenzene	Molecular	No	No	White	Solid

A student is gi ven an unkno wn substance. Based on the data in the tab le, what is the onl y proper ty the student should test to deter mine whether the substance is ionic or molecular?

   A. solubility
   B. conductivity
   C. color
   D. state of matter

11. A biologist studied growth in one species of tropical vine. Young tropical vines of equal height were planted in six identical containers. Three vines were in the control group, and three different vines were in the experimental group. As each vine grew, it climbed a stick placed in its container. All conditions, except one variable, were the same for both the control group and the experimental group. The data collected from the experiment is shown in the table below.

Vine Growth Data

Data Group	Plant Height (cm)				
	Oct. 1	Oct. 2	Oct. 3	Oct. 4	Oct. 5
Control					
1	5	8	12	20	25
2	5	9	15	24	29
3	5	7	13	19	22
Experimental					
4	5	8	10	12	15
5	5	9	11	13	16
6	5	8	12	16	18

a. Draw a line graph representing the results shown in the table. Use plant 2 and plant 5 to represent each data group.

b. Form a logical conclusion based on the data collected by the biologist.

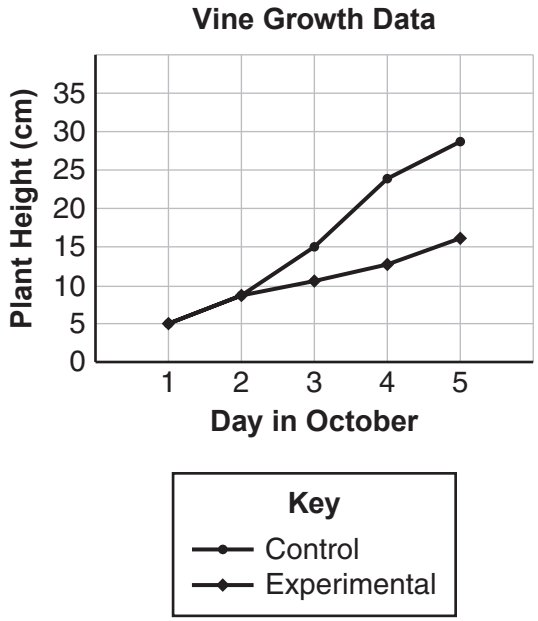
Scoring Guide

Score	Description
4	Response demonstrates a thorough understanding of reviewing evidence and communicating and defending results, and recognizes that the results of a scientific investigation are always open to revision by further investigations (e.g., through graphical representation or charts). The response provides a logical conclusion from the design and data provided, and correctly graphs the results. Response contains no errors or omissions.
3	Response demonstrates a general understanding of reviewing evidence and communicating and defending results, and recognizes that the results of a scientific investigation are always open to revision by further investigations (e.g., through graphical representation or charts). The response provides a logical conclusion from the design and data provided, and correctly graphs the results. Response contains one error or omission.
2	Response demonstrates a limited understanding of reviewing evidence and communicating and defending results, and recognizes that the results of a scientific investigation are always open to revision by further investigations (e.g., through graphical representation or charts). The response provides a logical conclusion from the design and data provided, and correctly graphs the results. Response contains two errors or omissions.
1	Response demonstrates a minimal understanding of reviewing evidence and communicating and defending results, and recognizes that the results of a scientific investigation are always open to revision by further investigations (e.g., through graphical representation or charts). The response provides a logical conclusion from the design and data provided, and correctly graphs the results. Response has one correct piece of information and contains several errors or omissions.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Scoring Notes

Award two points for each part correctly answered.

a. Correct graph is shown with the date plotted on the *x*-axis and the height (in cm) plotted on the *y*-axis. The graph should look similar to this:

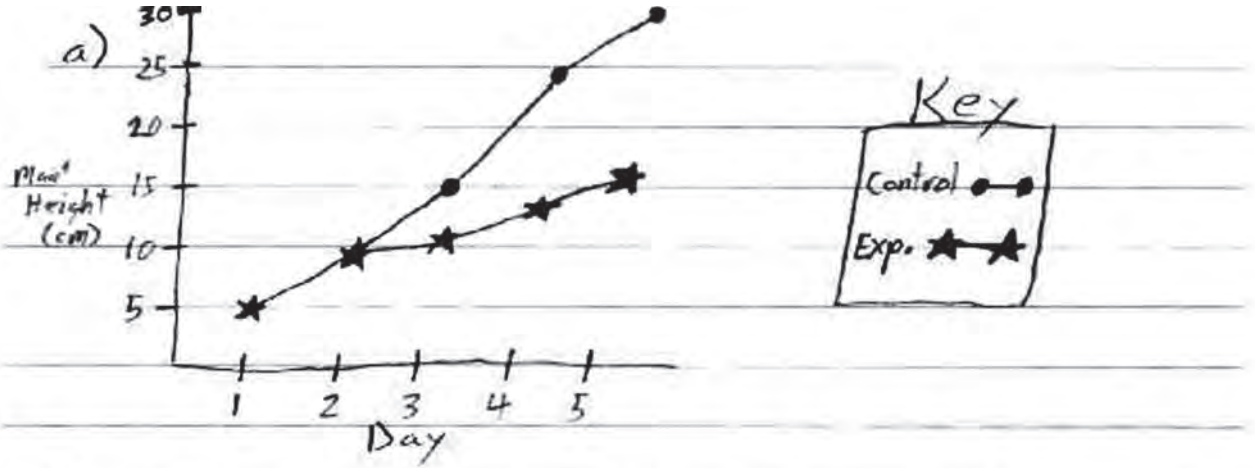


The control group (plant 2) shows more growth than the experimental group (plant 5).

b. Conclusion must state that the experimental group vines grew slower than the control group vines.

Example of Scor e Point 4

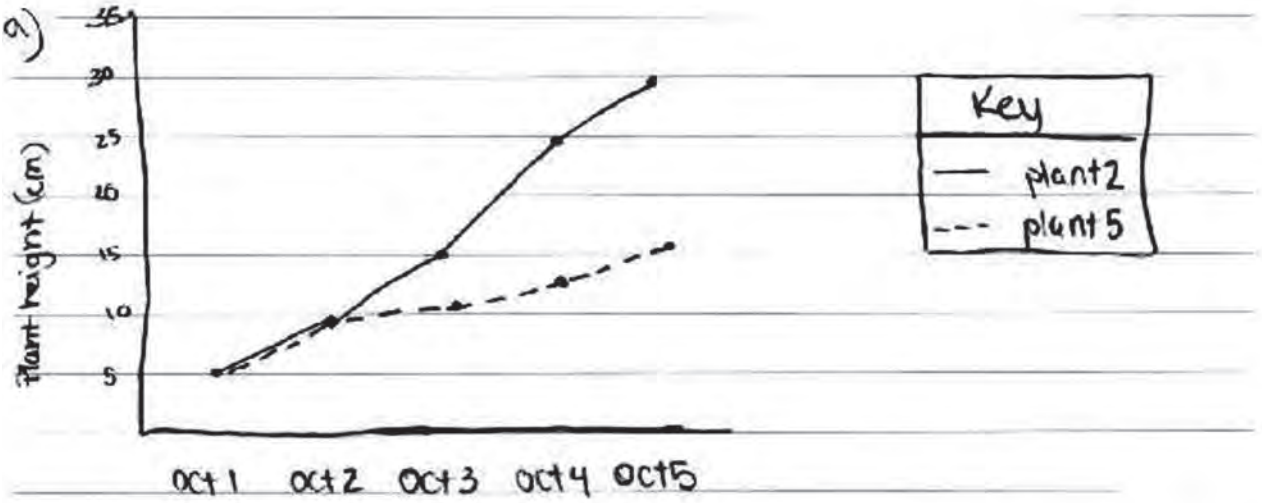
a)



b) Both the control and the experimental groups had the same growth rate on days one and two, but days three, four, and five, the control had a much faster growth. The variable caused the experimental plants to grow slower.

Example of Scor e Point 3

a)

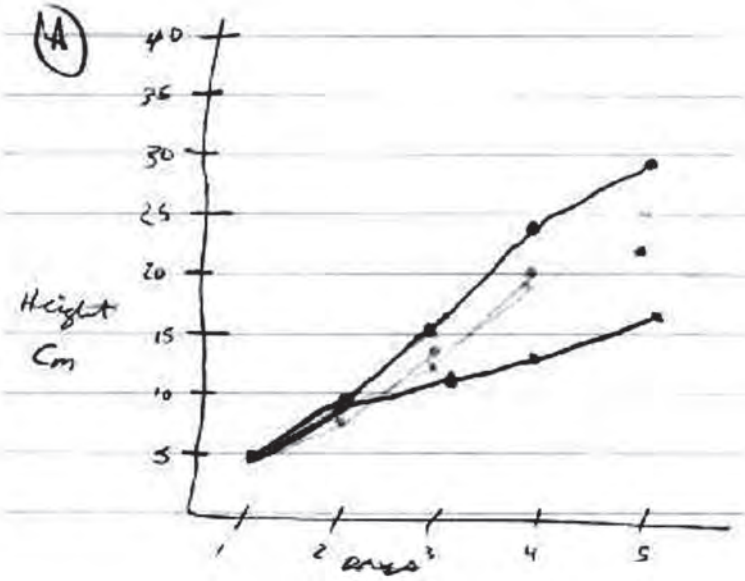


b) the controlled group increased in height a lot faster than the experimental group of plants

Example of Scor e Point 2

(B) The control grew taller than the experimental plant.

(A)



Example of Scor e Point 1

a) Plant 2 was in a controlled jar while Plant 6 was not.
b) The conclusion is that the controlled plants grew better than the ones that were not controlled.

Example of Scor e Point 0

b.) Each plants height increases with each experiment.

12. Many fish species release thousands of eggs during reproduction. Which factor helps keep these fish populations from becoming too large?

A. Fish eggs are very tiny.
B. The eggs do not all hatch at the same time.
C. Each female reproduces only once in her life.
D. Predators eat most of the eggs.

13. Which instrument should be used in an experiment to test the conservation of mass?

A. calorimeter
B. Celsius thermometer
C. meterstick
D. triple-beam balance

14. Which statement **best** represents the scientific process?

A. Theories, once established, do not change over time.
B. The primary role of scientists today is to form public policy.
C. The increased use of technology in science has eliminated human error.
D. Publishing results in scientific journals allows other scientists to repeat experiments.

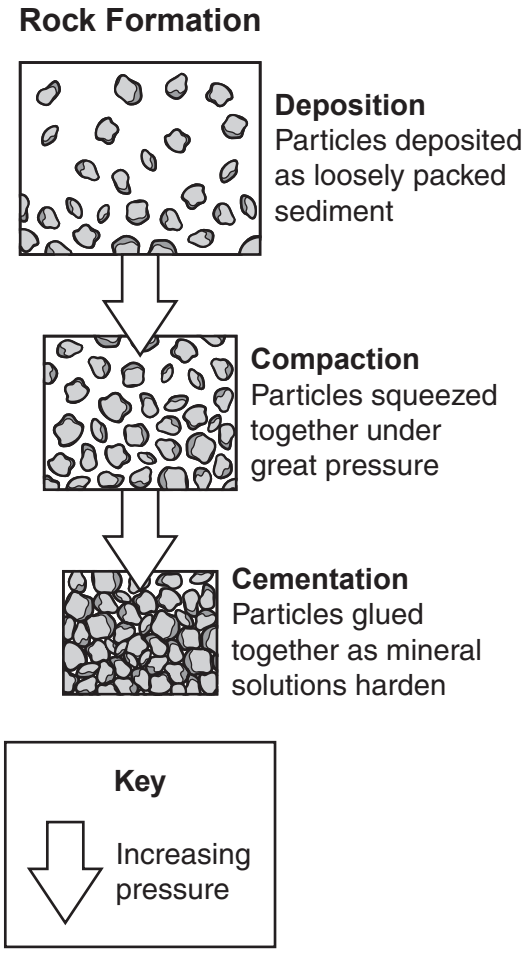
15. The western red cedar tree is native to Montana. Montana's climate is becoming much drier. What is the **most likely** response of the western red cedar tree to this change in climate?

A. Each red cedar tree will adapt to the surroundings where it is planted.
B. Red cedar trees that survive drought will pass on their genes to new seedlings.
C. Red cedar trees cannot change and will die out as a species in Montana.
D. Each red cedar tree will help change Montana back to a wetter climate.

16. How much force results when an 1,800 kg car accelerates 10 meters per second squared?

A. 10 N
B. 7,200 N
C. 18,000 N
D. 25,200 N

17. The diagram below shows one way rocks are formed.



Which process is **best** illustrated by the diagram?

A. igneous rock formation
B. sedimentary rock formation
C. igneous rocks changing into metamorphic rocks
D. sedimentary rocks changing into metamorphic rocks

18. A student wants to use the water displacement method to measure the volume of a rock. He follows this incorrect procedure:

    1. Fill a graduated cylinder with water.
    2. Place a rock in the graduated cylinder.
    3. Record the final volume of the water. The final volume of the water is the volume of the rock.

Which step needs to be added to this procedure before the rock's volume can be determined?

A. Record the mass of the rock.
B. Record the initial volume of the water.
C. Record the height and width of the rock.
D. Record the mass of the graduated cylinder.

19. Study the equation below.

$$\text{carbon dioxide} + \text{water} \xrightarrow{\text{energy}} \text{glucose} + \text{oxygen}$$

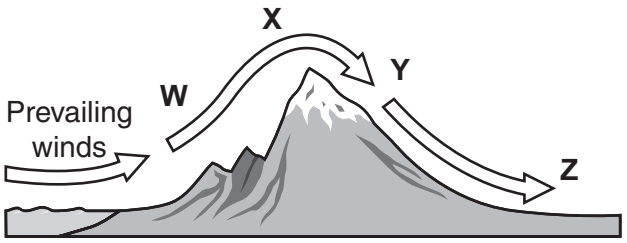
Where would this reaction take place in nature?

A. in an animal muscle cell
B. in an amphibian skin cell
C. in a budding yeast cell
D. in a plant leaf cell

20. Which information is **most** often learned from fossils?

A. the history of animal behavior
B. the history of environmental changes
C. the color of ancient organisms
D. the heart size of ancient organisms

21. The diagram below shows wind moving over the ocean, toward and over a mountain range, and over a plain.



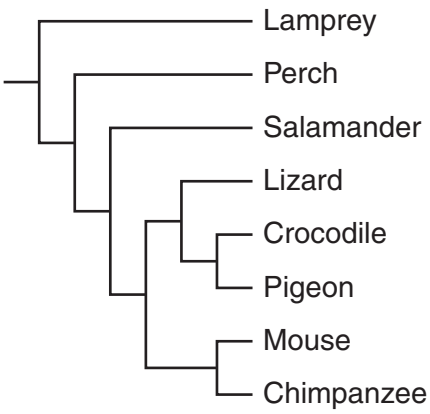
At which point in the diagram is the air the driest?

A. point W
B. point X
C. point Y
D. point Z

22. Which condition is **most likely** to completely preserve a dead animal as a fossil?

A. being quickly buried in soft mud on the ocean floor
B. being quickly buried under branches on sandy soil
C. decaying in open air and then being buried by gradual erosion
D. having a few large parts lodged in big rocks on hard ground

23. The cladogram below was constructed based on the presence or absence of se ven specific characteristics in different organisms. The lamprey does not ha ve any of the characteristics.



Which statement is suppor ted by the data in the cladogram?

A. The chimpanzee evolved most recently.
B. The pigeon and crocodile are the most closely related.
C. The perch does not share an y similar characteristics with the other or ganisms.
D. The mouse and chimpanzee share more characteristics than the perch and lizard.

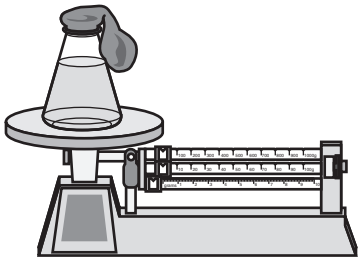
24. Which sequence illustrates the process of protein synthesis?

A. DNA → tRNA → mRNA → protein
B. protein → mRNA → tRNA → DNA
C. DNA → mRNA → tRNA → protein
D. protein → mRNA → DNA → tRNA

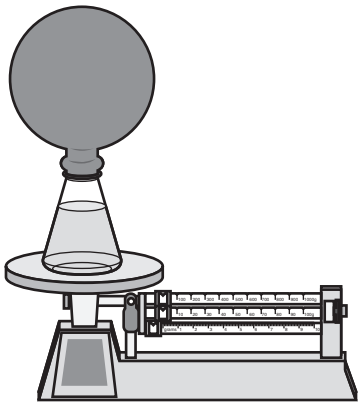
25. Helium's atomic number is 2, and its atomic mass is 4. Ho w many electrons does a neutral helium atom contain?

A. 2 electrons
B. 4 electrons
C. 6 electrons
D. 8 electrons

26. Baking soda is placed in a balloon. The balloon is then wrapped around the mouth of a flask that contains vinegar. Next, the flask is put on a balance. The baking soda is mixed with the vinegar and produces a gas that causes the balloon to expand. The reading on the balance does not change. The diagram below shows this experiment.



Before mixing



After mixing

Which conclusion is **best** supported by this experiment?

A. Gases do not have mass.
B. Gases are less dense than liquids.
C. There is no change in mass during a chemical reaction.
D. The reactants do not change during a chemical reaction.

27. Energy is released in many chemical reactions. What is the source of this energy?

A. chemical bonds between atoms
B. the force between protons and neutrons
C. changes in the structure of atoms
D. heat from the surroundings

28. Which molecule is oxidized to supply energy to the cells in a human body?

A. DNA
B. ethane
C. glucose
D. lysine

Acknowledgments

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"Knots to Know" (p. 6) by Robert Kimber, as it appeared in *Country Journal*, March/April 1991. Copyright © 1991 by Penton Business Media Inc. Published by Primedia Special Interest Publications.

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